Norwegian Support to the Land Sector in Kyrgyzstan

"The global development progress over the past decades has been unprecedented in human history."

Erik Solheim, Chair of the OECD Development Assistance Committee

A decade ago, the Millennium development goals were put in place and since that time, Norway has been one of the few countries committed to grant at least 1% of its gross national income to development aid. In 2015, Norway donated USD 4,28 billion or 1,05% GNI in official development assistance.

The Government takes an integrated approach to Norway's foreign and development policy. It is designed to promote economic development, democratization, and implementation of human rights, good governance and measures that can lift people out of poverty for good[1].

Nowadays, Norway is fully committed to the 2030 Agenda, nationally, as well as internationally[2]. Norway regards the 2030 Agenda with its 17 Sustainable Development Goals as a transformative global roadmap for our national and international efforts aimed at eradicating extreme poverty while protecting planetary boundaries and promoting prosperity, peace and justice[3].

The Norwegian Ministry of Foreign Affairs distributes more than USD 3,8 billion yearly as grants to Norwegian and foreign recipients. A large share of the grants is reserved for development aid, but grants are also given to support projects within central foreign policy areas such as Security Policy, the High North, EU/EEA, cultural cooperation and public diplomacy[4].

The Norwegian Ministry of Foreign Affairs administers the funds, and in this role calls for applications for funding, evaluates and select applications, concludes contracts with grant recipients, supervises project implementation and executes controlled use of the funds.

The Norwegian Mapping Authority participates in projects financed by the Norwegian Ministry of Foreign Affairs or the Norwegian Agency for Development Cooperation (Norad). The funds are transferred to the Norwegian Mapping Authority, which enters into contracts with various suppliers.

The Norwegian Mapping Authority is an active party in the official development assistance related to land administration, with emphasis on combating poverty through capacity building, with priorities and frameworks established in a dialogue with the Norwegian Ministry of Foreign Affairs.

In the implementation of projects we work closely with the beneficiary institutions. Depending on the funding mechanism, we can do the supervision, make procurements and provide quality control. We can also provide technical assistance, but goods and consulting services are generally procured from the private sector through local or international tenders.

1 https://www.regjeringen.no/en/topics/foreign-affairs/development-cooperation/id1159/
2 https://www.regjeringen.no/en/aktuelt/norway_sdg/id2503240/
3 https://sustainabledevelopment.un.org/memberstates/norway
4 https://www.regjeringen.no/no/dep/ud/tilskuddsmidler/id620650/

Securing ownership to land in Kyrgyzstan

Several grant programs are established for the ODA countries. One of the programs supports projects in the former Soviet states, which include Kyrgyzstan – a country in Central Asia bordering Kazakhstan, China, Tajikistan and Uzbekistan.

The Norwegian Mapping Authority has been engaged in development cooperation since 2005 and it has supported development of the land sector in Kyrgyzstan from 2013 to 2016. After an invitation from our Kyrgyz partner - the State Registration Service of Kyrgyzstan, we visited Kyrgyzstan to investigate the possibilities of project cooperation. In the wake of this trip, we submitted a project application which was accepted by the Norwegian Ministry of Foreign Affairs.

With a grant of ca. USD 1,4 million, the project "Securing Ownership to Land" jointly implemented by the Norwegian Mapping Authority and the State Registration Service of Kyrgyzstan, was aimed at the improvement of registration and information services to all groups of users requesting property registration and information.

Kyrgyzstan (Figure 1) is one of the poorest republics in the former Soviet Union. There are not many natural resources in the country, apart from land for farming and grazing. Gold and other minerals can be found, but this industry is little developed. There are around 5,6 million inhabitants from different ethnic backgrounds in Kyrgyzstan, on an area a little under 200 000 square kilometers. 937 000 people live in the capital Bishkek. There is a considerable Uzbek minority living in Kyrgyzstan and until recently the conflict level has been quite high. This makes the need for clear and secure rights in land even greater.

Figure 1: Political map of Kyrgyzstan[5]

Since the establishment of an independent state, the Government of Kyrgyz Republic has put a lot of effort into privatization of land and buildings, being a prerequisite for social and economic development of a country. Security of ownership, which can only be ensured with functioning registers and reliable maps, receives much attention in a country where farming is the largest

[5] http://www.nationsonline.org/oneworld/map/kyrgyzstan-political-map.htm

resource for income. Clear documentation of the boundaries of private parcels, land left for common use as pastures, rights to registration and related services, as well as ownership and transactions, are very important for confidence in a government.

Approximately 3 million private properties have been established. From 2012 to 2015, the number of properties registered in the Land Book exceeded 2,8 million (Table 1).

Table 1: Number of registered properties from 2012 to 2015

The number of transaction with land was ca. 0,7 million (Table 2). The market in private properties is rapidly expanding, which also expands the demand in reliable information about properties.

Table 2: Number of registered transactions from 2012 to 2015

To meet this demand, a satisfactory registration system has to be in place, especially to service external users in public and private sectors with complete and up-to-date property information.

When the project started in 2013, the property registration system was fragmented into several systems for maps and textual information respectively. Official data was produced and kept

locally at each registration office. Textual information about ownership and other rights was frequently copied to a central database, but it was not linked with maps showing boundaries.

The Norwegian-funded project was built upon important achievements of the earlier projects, especially of the First Land and Real Estate Registration Project funded by the World Bank.

The World Bank has provided significant support to the property sector in Kyrgyzstan. The First Land and Real Estate Registration Project has helped to develop land administration services and data essential for a well performing land and real estate market in the country. Under this project 50 offices were opened, a systematic (mass) registration of rights to immovable property for more than 2,4 million property units was carried out and electronic database was developed.[6] The methodology for documenting privatized parcels has been developed and tested, ensuring that 80% of privatized properties have been well documented.

When the World Bank project in Kyrgyzstan came to an end in 2012, it remained to upgrade the maps for 20% of privatized properties to bring clarity to boundary issues and to link information about ownership with the reality on the ground. And the developed methodology provided a good platform for the surveying and mapping of the remaining properties.

Building on the above achievements, the Norwegian project was focused on

- *specification of improvements to property registration system KLIS - Kyrgyz Land Information System,*
- *surveying and mapping the remaining 20 % of privatized properties, and*
- *extension of KYRPOS - the network of continuously operating reference stations*

Specification of improvements to KLIS - the Kyrgyz Land Information System

The development of Kyrgyz Land Information System has been ongoing since 2002, with considerable results. A number of systems are in place to support the local and central activities on registration of property rights and transactions. The existing solutions have positive characteristics serving the registration processes well. The system consists of clearly defined and distinct components. The user interfaces have matured through years of practical use.

In February 2011, the Kyrgyz partner adopted a policy on ICT development strategy to generally outsource the development of new systems, and to maintain the control of design, architecture, operation and first line support in-house.

KLIS is seen as a central database with textual information connected to the maps, and making it possible for local registration offices and external users to communicate with the database via Internet using web-services, as shown on Figure 2.

It is clear that a centralized system solution provides for security and integrity of stored data, and ensures better transparency by giving access to information via Internet. It facilitates exchange of data with other public institutions, such as the tax authority, the population and

[6] Implementation completion and results report (H-380KG). Document of the World Bank, 2014

business registers etc. In Kyrgyzstan, the database is largely used in elections for compiling voters' lists.

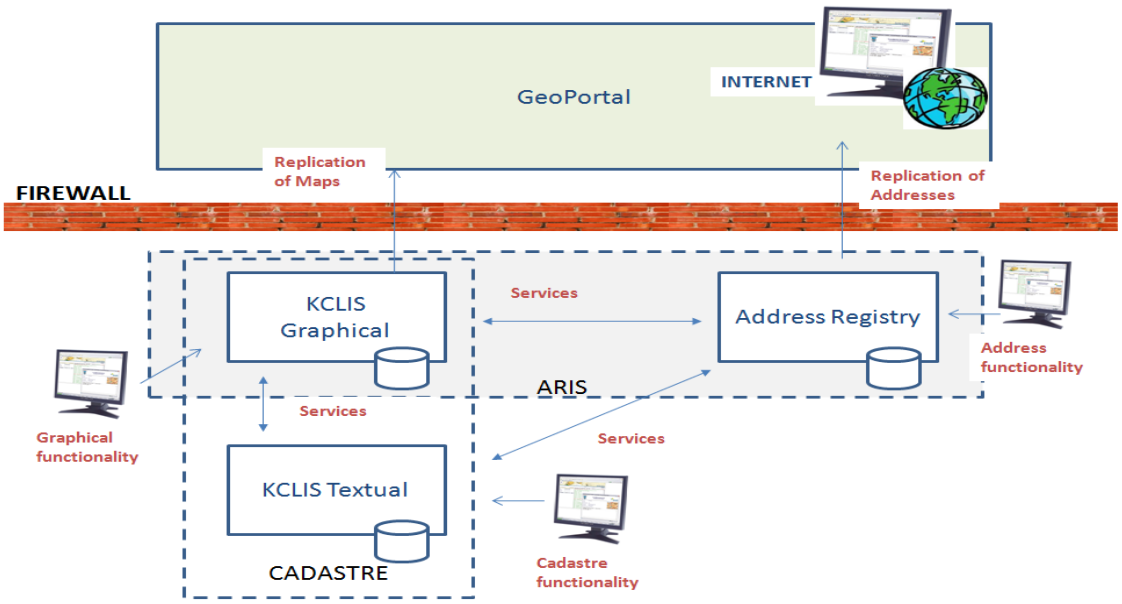

Figure 2: The Kyrgyz Land Information System

The work started with the development of the strategy and general policy for ICT system improvement. The system needed upgrade to match the following improvement goals:

- offer new services
- improve the system integration, and thus the interoperability
- centralize the system to create a more manageable and efficient web-based solution
- reduce system redundancy

A similar system was successfully implemented in Armenia with support from Norway. The solution for Armenia is up and running, using open source, free software, thus avoiding heavy license costs. This is particularly important for ensuring sustainability in a country with limited access to funds. Telecommunication networks can now support a centralized register solution also in Kyrgyzstan.

The implementation strategy was based on the close involvement of the staff in the solution design. Two Norwegian IT-consultants engaged in the project recommended the following principles in the system upgrade:

- to create an architecture road-map built up on well-documented baseline system architecture and target system architecture
- to apply a subset of modern Enterprise Architecture principles, such as The Open Group Architecture Framework (TOGAF), in the planning and system implementation
- to apply Service Oriented Architecture (SOA), which implies building the system with distinct re-usable components, communicating with each other via web-based interoperability services
- to choose applications and services based on interchangeable components and standards-based interfaces
- to consider thoroughly whether the existing services and functionality could be used in the new solution.

The staff had a general competence level to match the policy of the institution. However, competence updating and a more systematic approach to human resource management was needed to meet the requirements for further development of the ICT infrastructure.

Knowledge transfer and training was an important part of the project. A series of training courses directed at building technical competence for establishing a spatial data infrastructure harmonized with the INSPIRE directive were conducted both in Norway and in Kyrgyzstan:

- Enterprise Architecture, principles and methodology, TOGAF
- Introduction to Service Oriented Architecture (SOA), principles and standards
- Web mapping services, WMS, WFS, WCS Catalogue Service
- ISO, OGC, Inspire standards and guidelines: International standard on Land Administration Domain Model was translated to the Russian[7] language, so it could be used by all staff members and by the management when needed.

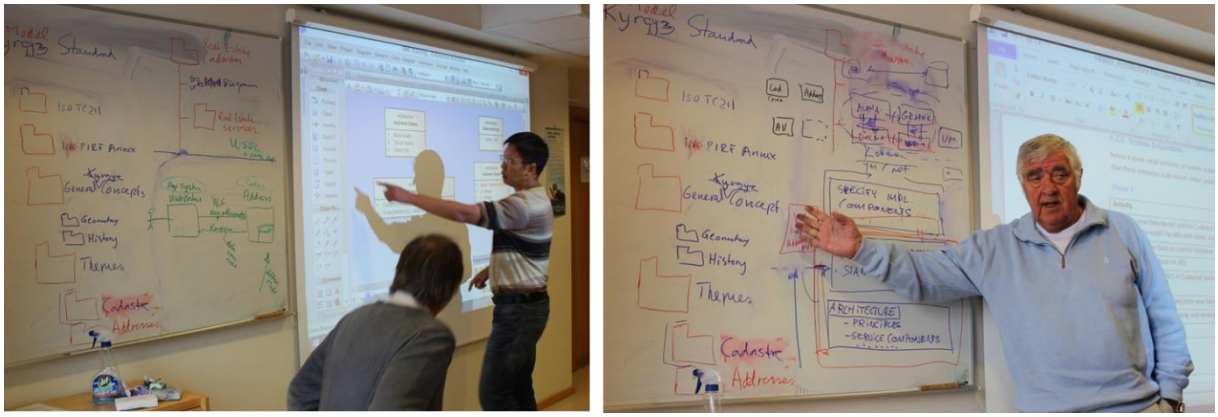

Figure 3: UML-modelling course in Oslo

After basic introduction to UML-modelling a conceptual database model was developed.

It has also become evident that the baseline architecture was described well, however spread on many documents. The task was to consolidate the baseline system architecture description in a standardized way, i.e. using a set of simple catalogues, matrixes and diagrams, which were lately used to describe the target system architecture. Having in place both description, the gap analysis was executed and the analysis outcomes formed a basis for planning the system architecture upgrades and to establish the system architecture roadmap. Based on the system architecture roadmap, the system requirements specifications were elaborated and approved.

The task of the project was limited to design KLIS system architecture, to develop the database model and to prepare system requirement specifications. KLIS system development is now ongoing with the funds provided by Korea International Cooperation Agency (KOICA).

When the improvements are implemented the system will have sufficient capacity to efficiently serve users in private and public sector providing data in real time on the Internet.

This will make the information on property rights more accessible, more reliable, and more transparent. This will build up more trust in the Kyrgyz Land Registry and will give impetus to the developing land market supporting the country's economic growth; reducing corruption, improving governance, and effective public administration.

[7] Russian language is one of the two official languages in Kyrgyzstan

Surveying and mapping the remaining 20% of privatized properties

One of the project goals was to ensure that all privatized properties were well documented in the unique register, providing security of ownership to all, and better services to users of property information.

The methodology for this has been established and well tested in the World Bank "Second Land and Real Estate Registration Project" in 2010-2012. The technical approach was to scan paper maps and to digitize cadastral index map content from scanned images into several map layers.

The data was subject to internal quality control of the vector maps, including a check of the linkage between land parcels, parcel identifiers and street addresses. Next step was geo-referencing of parcels in built-up areas by field GPS/GNSS surveys of block corners, street intersections, and similar objects that could be clearly recognized on maps.

Two local surveying companies were engaged in the geo-referencing of cadastral index maps for 7 local registration offices covering project area shown on Figure 4.

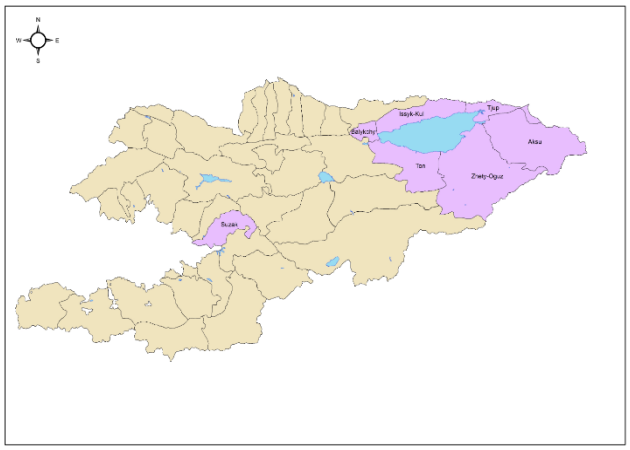

Figure 4: Project area

The surveying companies were asked to do field surveying, locate the points on the ground that coincide with points on the cadastral index maps, and determine their coordinates. Table 3 shows the output of this operation with a breakdown by Local Registration Offices.

Table 3: Georeferenced maps

Local registration office	Number of map sheets scale 1:2000	Number of map sheets scale 1:10000 or 1:25000	Number of urban parcels	Number of rural parcels
Karakol-Aksuu	184	80	31 611	24 162
Issyk-Kul	215	102	33 284	24 158
Balakchy	114	0	7 352	18
Jety-Oguz	363	160	25 275	32 998
Ton	116	134	14 685	16 939
Tyup	188	69	14 495	23 227
Suzak	516	156	61 266	99 672
Total	1 180	545	126 702	121 502

Extension of KYRPOS - the network of continuously operating reference stations

The World Bank also funded the establishment of a number of reference stations for efficient use of satellite technology (CORS) for surveying of parcels boundaries especially.

In the Norwegian project the KYRPOS-network was extended with 10 more stations, and the control centre was upgraded. Almost all areas of economic interest with active land market is now covered with KYRPOS services.

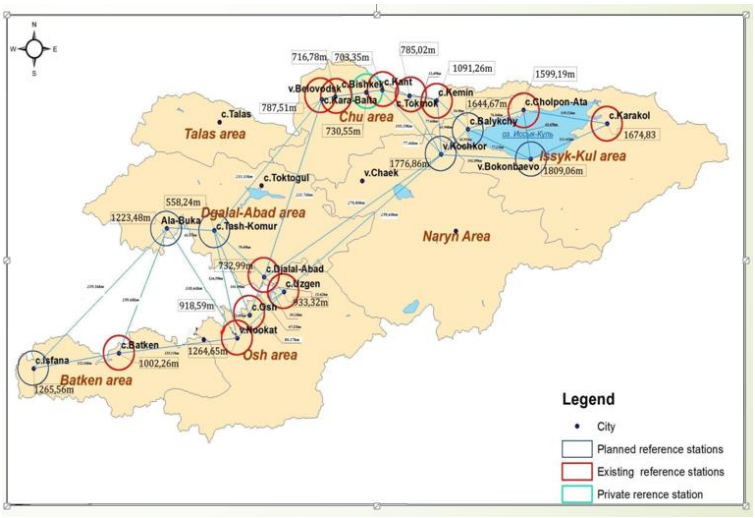

Figure 5: KYRPOS – location of reference stations

In addition, all local registration offices received satellite surveying instruments. Now they can benefit from higher efficiency and improved geodetic accuracy in their work.

This capacity building has already demonstrated improvements in servicing clients by reducing the average time needed for cadastral registration. In 2014, first time registration of a property including cadastral surveying took 9 working days on average. Using GPS surveying technology, the same procedure now takes up to 3 working days.

Expanding the network of permanent reference stations and providing all local registration offices with GPS receivers and training, as well as geo-referencing digital cadastral maps has allowed implementation of digital mapping in the local registration offices, which improved the quality of services, reducing their costs and time.

Figure 6: GPS surveying technology in use

Using UAV technology for data collection and preparation of maps

There is currently very limited capacity for airborne data collection in Kyrgyzstan, both in private and public sectors. No private company can offer data collection from airplanes. The existing maps in Kyrgyzstan need updating and maintenance to show changes which occurred in the rapidly growing capital-city of Bishkek and other settlements, new roads and pipeline, changes in terrain etc. The orthophotos in use in Kyrgyzstan today have a resolution of 20 - 40 cm. They were collected in 2002 with an analog film camera and then scanned into normal color. These orthophotos have varying quality and only cover parts of the cities Bishkek and Osh, and are not sufficient for cadastral use.

The Norwegian Mapping Authority was asked to evaluate the potential benefits of using UAV technology for aerial photography of smaller areas and projects in need of up-to-date orthophotos. It is understood that the UAV technology will not yet fully substitute, but rather supplement classic aerial photography. It is however proven that the UAV platform is a good and efficient alternative for smaller project areas and mapping corridors (typically 5-15 km^2), where the data is urgently needed and can be produced and delivered fast.

The relevance of using UAVs for data collection in Kyrgyzstan with respect to needs for data and with consideration for the capabilities of the State Registration Service to do such data collection and processing in a sustainable way, was evaluated. The conclusion was that there is a need for "mapping-on-demand" in Kyrgyzstan and the institution is in position to efficiently use the technology. Both fast-wing and rotor-wing drones were procured. The staff was trained in flying and data processing.

Figure 7: Data capture with a fast-wing drone Trimble UX-5 HP and the vehicle for field works

Ten areas were flown during summer 2016 and the results were presented at the workshop "New technologies for data acquisition" in Batumi, Georgia on 8-9 September 2016.

Assessing the project results

The project is now completed, delivering satisfactory results to all involved parties and meeting its development goal in improving security of ownership to land in Kyrgyzstan.

We can safely consider the project a success, given the relatively modest amount of the grant and the outcomes achieved. We especially want to emphasize those factors that have played an important role in achieving the project objectives.

An important factor for success is that the project was built upon a close co-operation between two mapping and cadastre authorities from Norway and Kyrgyzstan.

On the recipient side, the management showed a professionalism and constructive and supportive position; the staff was dedicated and closely involved in all project activities. Knowledge transfer and training were received with enthusiasm and interest.

Involvement of the local mapping companies was very beneficial and cost-effective.

Particular attention should be given to the gained experience in use of drones for mapping of smaller areas. It is a revolutionary tool for Kyrgyzstan - a total solution that allows you to receive photomaps for updating the cadastre quickly.

On the donor side, it was very beneficial to having engaged highly professional consultants in the project team, as well as being able to communicate in the Russian language.